

PCT

To:

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing

(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION

See paragraph 2 below

International application No.
PCT/US2004/030390

International filing date (day/month/year)
15.09.2004

Priority date (day/month/year)
17.09.2003

International Patent Classification (IPC) or both national classification and IPC
H04L27/26

Applicant
INTEL CORPORATION

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. ☐ It has not been possible to consider the validity of the priority claim because a copy of the priority document was not available to the ISA at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

4. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-20
Inventive step (IS)	Yes: Claims	
	No: Claims	1-20
Industrial applicability (IA)	Yes: Claims	1-20
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: SAI KIT LAI ET AL: "Adaptive trellis coded MQAM and power optimization for OFDM transmission" VEHICULAR TECHNOLOGY CONFERENCE, 1999 IEEE 49TH HOUSTON, TX, USA 16-20 MAY 1999, PISCATAWAY, NJ, USA, IEEE, US, vol. 1, 16 May 1999 (1999-05-16), pages 290-294, XP010341993 ISBN: 0-7803-5565-2
- D2: US 2003/043732 A1 (WALTON JAY R ET AL) 6 March 2003 (2003-03-06)
- D3: US-A-5 400 322 (HUNT ET AL) 21 March 1995 (1995-03-21)
- D4: LI ZHEN ET AL: "A modified sub-optimum adaptive bit and power allocation algorithm in wideband OFDM system" CCECE 2003. CANADIAN CONFERENCE ON ELECTRICAL AND COMPUTER ENGINEERING. MONTREAL, CANADA, MAY 4 - 7, 2003, CANADIAN CONFERENCE ON ELECTRICAL AND COMPUTER ENGINEERING, NEW YORK, NY : IEEE, US, vol. VOL. 3 OF 3, 4 May 2003 (2003-05-04), pages 1589-1592, XP010654111 ISBN: 0-7803-7781-8

- 1 Claim 1 is not clear (Article 6 PCT) because the term subcarrier is only understandable in the context of multicarrier transmission as e.g. Orthogonal Frequency Division Multiplex OFDM.

For this reason the feature of OFDM should have been included in the claim.

The same applies to independent claims 6 and 11.

- 2 The subject-matter of claim 1 is not new (Article 33(1),(2) PCT) because

D1 shows a method, comprising:

- receiving a channel state information of a communication channel ("instantaneous channel transfer function" in "II. ATCM-OFDM SYSTEM", left-hand column on page 291);
- rescaling subcarrier power of an OFDM signal based on the channel state information (steps 2 to 4 of the algorithm in right-hand column on page 292); and
- adjusting a modulation rate based on the channel state information (Table II, left-hand column of page 292).

3 The subject-matter of claim 1 is equally known (Article 33(1),(2) PCT) from document D2 which shows:

- receiving a channel state information of a communication channel (CSI in [209]);
- rescaling subcarrier power of an OFDM signal based on the channel state information (in last sentence of [209] ".. determines which transmission channels to select .."); and
- adjusting a modulation rate based on the channel state information (in last sentence of [209] ".. select the appropriate coding and modulation scheme(s) ..").

4 The subject-matter of claim 1 is equally known (Article 33(1),(2) PCT) from document:

D3 see ".. monitors the mean squared error or MSE of each subchannel .." in column 8, lines 6-12; block 70 in figure 4; and ".. updating of the bit allocations .. changes in the energy scaling factors .." in column 11, lines 1-6; block 90,94; and from document

D4 see in the last paragraph of left-hand column on page 1590 "channel quality estimation"; "power allocation" and "modulation mode".

5 Independent claim 6 specifies an article carrying instructions which when executed perform the method steps of claim 1.

The structural features of the apparatus of claim 11 correspond to the method steps of claim 1.

Consequently, the subject-matter of these claims is not new or not inventive (Article 33(1-3) PCT) for the same reasons as claim 1.

- 6 Independent claim 16 differs from claim 11 by additionally specifying an antenna, thus applying to radio transmission, which is however also shown in D1 (abstract and introduction), D2 ([0003]) and D4 (first sentence of "1.Introduction") contrary to the requirements of Articles 33(1),(2) PCT.
- 7 If novelty should be disputed based on some minor difference of interpretation, it is pointed out that the subject-matter of the independent claims 1,6,11,16 would in any case not involve an inventive step (Article 33(3) PCT), given that D1-D4 attempt to solve the same problem "bit and power allocation for a multicarrier system" and describe the same type of solution as presently claimed.
- 8 The dependent claims 2-5, 7-10, 12-15, 17-20 do not add new or inventive matter to the claims upon which they are dependent (Article 33(2,3) PCT) as their subject-matter is either directly derivable from the above cited documents or concerns normal design measures.
See especially regarding claims
2,7,12,17 (maintain a constant bit error rate):
 - D1 last paragraph of left hand column on page 292
 - D4: "BER requirement" in second to last paragraph of right-hand column on page 15903,8,13,18 (turning off sub carriers with lower gain):
 - D1 implicit in the algorithm: no power for no bit allocated
 - D2: selective channel transmission [203]
 - D3: column 7, lines 57-60
 - D4: "no transmission" in second paragraph of left-hand column on page 15914,9,14,19 (trellis coded modulation):
 - D1: Table II, left-hand column of page 292)
 - D3: trellis coder 32 in figure 25,10,15,20 (comparison to predetermined value)
 - D4: "SNR threshold" in second paragraph of left-hand column on page

1591

Further remarks:

- 9 The first part of the sentence on page 1, lines 9-13 is syntactically unclear, see "... **without over** a smaller change ..".
- 10 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- 11 The independent claims should be in the two-part form required by Rule 6.3 PCT.
- 12 Contrary to the requirements of Rule 5.1(a)(ii) of the PCT, documents D1 - D4 cited above have not been acknowledged and briefly discussed in the opening part of the description.

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